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The effect of participation in a community gardening program on mood of college students

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The Effect of Participation in a Community Gardening Program on Mood of College Students

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Abstract

The purpose of this study was to find the effect of gardening in a community setting on mood and affect of college students. Participants of the study included sixteen students attending James Madison University. There were eight controls and eight gardening participants in the six-week experiment. All participants took a pre and posttest based on the Positive and Negative Affect Scale-X (PANAS-X). Gardening groups also took the Affect Balance Scale (ABS) after an hour-long gardening session each week.

Statistical analysis showed significant changes in several of the items examined by the PANAS-X. Among gardeners, negative affect went down significantly ($t=0.019$) while feelings of fatigue rose ($t=0.035$). There were no statistically significant changes from pretest to posttest among the control group. Statistical tests run on the weekly ABS taken by gardeners showed no statistically significant changes, but analysis of individual questions showed some improvements in mood from the early weeks to the later weeks of the experiment. Reflections from gardeners also included statements about the relaxed nature of gardening and its effect as a stress reliever. Gardening participants also experienced increased socialization in the garden as the weeks progressed.

The study concluded that gardening does have a significant effect on mood of college students. With a more consistent gardening environment for participants, more defined results may have been found. From the results found in this study, gardening's effect on mood of college students is a worthwhile topic to continue researching. Further research could include finding effective ways to use gardens on campus to help improve mood of students.

Chapter 1: Introduction

Mood and affect in college students is often low, nearly thirty percent of college students report having been so depressed within the past year that it was difficult to function (National Institute of Mental Health, 2012). At one northeastern university, more than half of a study sample demonstrated a significant winter mood pattern, which consists of depressed moods recurrent in fall and winter with non-depressed periods in spring and summer (Rohan & Sigmon, 2000). With levels of depressive symptoms seeming to increase between the ages of ten and twenty (Falci, 2008; Ge, Conger, & Elder, 2001), college students are an important population to reach with programs to improve mood and affect.

Conventionally, treatment for depression includes cognitive-behavioral or interpersonal psychotherapies and antidepressant medication (Gonzalez, Hartig, Patil, Martinsen, & Kirkevold, 2010; Gonzalez, Harig, Patil, Martinsen, & Kirkevold, 2011). These treatments work for some, but not all (Gonzalez et al., 2010). For those who are nonresponsive to traditional treatments, or opt out of traditional treatments for a variety of reasons, there are complementary or supplementary interventions for treating depression, although research on these options is relatively sparse (Jorm, Christensen, Griffiths, & Rogers, 2002).

One complementary therapy being studied is the use of community gardens or horticultural therapy for mood improvement. Therapeutic horticulture has a lengthy clinical tradition, but few studies focus on its potential use in the field of mental health (Gonzalez et al., 2012). Many studies on therapeutic horticulture have been performed using older adults, especially those residing in nursing facilities, but if included, gardening's affect on mood is usually secondary or a side focus (Barnicle & Midden, 2003; Brown, Allen, Dwozan, Mercer, &

Warren, 2004; Martin, Miranda, & Bean, 2007; Tse, 2010). In studies specific to community gardens, much of the evidence supporting mood changes is anecdotal and few studies have specifically focused on the health and psychological health of those who work in community gardens (Wakefield, Yeudall, Taron, Reynolds, & Skinner, 2007). A few studies have also focused on depression and gardening (Gonzalez et al., 2010; Gonzalez et al., 2011), but studies concentrating on the effect of gardening on mood improvement specifically, are unavailable. Little is known about the 'effective dosage' of gardening or how active one must be to benefit from a community garden (Okvat & Zautra, 2011).

Several studies focused on the implementation of community gardens and how community gardens are received among different communities (Armstrong, 2000; Hale et al. 2011; Okvat & Zautra, 2011; Tieg, Amulya, Bardwell, Buchenau, Marshall, & Litt, 2009; Wakefield et al., 2007), although younger populations have had a lack of representation. While these studies were not focused on the mental health of gardeners specifically, psychological improvements were often mentioned in interviews with gardeners (Armstrong, 2000; Hale et al., Tieg et al., 2009).

This study builds on previous studies on gardening and mood. The population included college students from James Madison University, breaking away from previous studies targeting older populations. The study also focused specifically on gardening's effects on mood rather than how gardens affect communities, as many community garden studies have done in the past.

The hypothesis was that weekly sessions in a group gardening scenario would correlate with improved mood from the first session to the last session of gardening in a sample of college

students. The objective of the study was to evaluate how gardening affects mood in college students over time.

The hypothesis was tested in a quasi-experimental study design. Subjects were volunteers responding to poster advertisements placed around campus. Subjects worked in groups of three or four once a week for six weeks. A survey was used at the beginning and the end of the six week program to evaluate changes in mood and affect. Affect refers to the overall feelings or emotions of a person (Gonzalez et al., 2011). A control group was also recruited. These participants took the same pre and posttest for comparison to evaluate if mood changes were due to the gardening program or if they could be related to other factors such as time in the semester or season changes.

If the study shows that community gardening leads to improved mood in college students, gardens could be implemented on campuses. Resources like the Varner House, the university's mental health resource, could add a gardening therapy option for students receiving counseling. Further studies could be done to find out the best ways to implement gardens on campus and how gardens could best be used to improve moods of students on campus.

Chapter 2: Review of Literature

Although the exact prevalence is unknown, depressed mood is a common occurrence in adolescence and young adulthood. Steinhausen, Haslimeier, and Metzke (2006) have estimated prevalence figures for affective disorders ranging from 1.8% to 5.1%. The National Institute of Mental Health (2012) estimates that up to thirty percent of college students reported severe depressive symptoms within the past year.

Levels of depressive symptoms seem to increase through adolescence between the ages of ten and twenty (Falci, 2008; Ge et al., 2001). On average, there are relatively low levels of depressive symptoms in childhood (Wickrama et al., 2009). These symptoms then increase greatly in early to middle adolescence, and begin to decrease in late adolescence (Wickrama et al., 2009). Females usually see an increase in depressive symptoms in early adolescence while males have an increase in depressive symptoms later in adolescence; this gender gap generally declines with the transition into young adulthood (Falci, 2008). Because of these high statistics, college students are an important group to reach out to with resources to fight depression and improve mood.

In a study done by Rohan and Sigmon (2000) at a northeastern university, more than half of the sample of college students demonstrated a significant winter mood pattern "associated with decreased mood, energy level, and social activity and increased weight gain, appetite, and sleep length throughout the winter months" (p.93). Over 16% of the sample met requirements for Subsyndromal Seasonal Affective Disorder and over 5% met criteria for Seasonal Affective Disorder (Rohan & Sigmon, 2000). Throughout the study, only one of the fall participants reported no experience of seasonal behavioral changes along with one spring participant

reporting no experience of seasonal behavioral changes (Rohan & Signmon, 2000). Stress and depression scores tend to be higher among college students during final exams no matter what the season (Rohan & Sigmon, 2000).

Individual variations in depressive symptoms among adolescents have been associated with different risk factors (Wickrama et al., 2009). Adolescents with higher self-rated depressive symptoms have usually experienced more negative life events than those in the controls group (Steinhausen et al., 2006). While negative life events cannot be changed, intervention therapies can help with other risk factors, such as stress reactivity. Stress reactivity refers to the amount of stress a person experiences due to a stressor, each person reacts to a stress in a different way with different types and amounts of stress (Felsten, 2004). A study by Felsten (2004) found that stress reactivity was a stronger predictor of depressed mood in college men and women than total levels of stress. The study found that across several months, stress reactivity did not change with levels of stress, but depressed mood was higher in times of more stress (Felsten, 2004). Students that were more reactive to stress reported more symptoms of depressed mood than less reactive students whether they had more stress or not (Felsten, 2004). Steinhausen et al. (2006) found that persistent depressive symptoms are related to poor adaptation more than episodic depressive symptoms are. Giving students an outlet for stress, such as the opportunity to work in a garden, could help to reduce stress and improve mood in students with high stress reactivity. A study by Wickrama et al. (2009) found that groups of youth showing more risk factors and vulnerability to depression can be identified early for intervention efforts. Intervention efforts "should promote and develop resiliency factors, aid in redirecting adverse mental health trajectories of youth, and moderate the relationship between adverse mental health trajectories and increases in physical health problems" (Wickrama et al., 2009, p. 342).

Conventional means of treatment for depression include cognitive-behavioral or interpersonal psychotherapies and antidepressant medication (Gonzalez et al., 2010, Gonzalez et al., 2011). Although these treatments work for many patients, for a substantial number of patients, there is no response to these conventional treatments (Gonzalez et al., 2010). There are options for complementary or supplementary interventions when treating depression, but research on these options is relatively sparse (Jorm et al., 2002). Studies done on increasing pleasant activities have shown positive effects on mood (Gonzalez, et al., 2010, Jorm et al., 2002). One possible complementary intervention method for vulnerable youth could be involvement in a community garden.

According the American Community Gardening Association, a community garden is defined as any piece of land gardened by a group of people (Teig, et al., 2009). It can be in an urban, suburban, or rural setting. Formats of gardens can vary from communal plots to a group of individual plots (Teig, et al., 2009). Okvat and Zautra (2011) have a more concise definition of community gardens as being plots of land used to grow food by members of different families. A study done in South-East Toronto by Wakefield and colleagues, (2007) had a diverse array of gardens ranging in size and organization; plots ranged from large fields to the narrow spaces between buildings and sidewalks. Some gardens had plots for individuals, while others were communally worked (Wakefield et al., 2007). With these varying definitions for community gardens, two requirements stood out, the need for shared land to garden and the communal nature of working together on that land.

Historically in the United States, community gardens have arisen as responses to crisis (Okvat & Zautra, 2011). In the late 1800s, poor residents in cities were offered vacant lots as an opportunity to grow food (Okvat & Zautra, 2011). During the Great Depression, New York City

was cultivated with nearly 5,000 gardens on city land to increase food supplies for the poor and unemployed (Armstrong, 2000; Okvat & Zautra, 2011). Both World Wars saw community gardens as a means to increase the food supply while decreasing the need for transportation. World War II's "Victory Garden" campaign was quite extensive, with 18 to 20 million families creating victory gardens (Okvat & Zautra, 2011). After World War II, urban community gardens were created as a response to the growing population and deteriorating quality of life in inner city neighborhoods (Okvat & Zautra, 2011). Beginning in the 1970s, community gardens shifted from government organized occurrences to "locally-driven, grassroots movements," which has continued to the present (Okvat & Zautra, 2011, p. 384).

Recently, gardening has been labeled as one of the most common types of exercise and a leading leisure-time physical activity (Armstrong, 2000). In 1997, gardening was identified as the number one leisure pursuit among older Americans (Barnicle & Midden, 2003). Many elderly citizens in the United States have fond memories connected to gardening experiences through both helping loved ones or tending their own gardens (Martin et al., 2008). Since gardening is a common type of exercise and is linked to pleasant memories, it could be a useful tool for improving mood of individuals.

Community gardens have repeatedly been associated with improved mental health (Armstrong, 2000; Teig et al., 2009; Wakefield et al., 2007). Use of gardens as a tool in the promotion of mental health could be a useful device. Gardens create a setting that has "purpose and coherence and are associated with positive social and psychological processes" (Hale et al., 2011, p. 1855). In a study by Hale et al. (2011), one interviewee described the process of following the garden from the initial preparation of soil, through planting and harvesting as 'very satisfying' (p. 1858). Gardening activities promote enthusiasm, feelings of responsibility and a

sense of accomplishment through getting to choose plant materials and having the hope for the garden to grow (Tse, 2010; Wakefield et al., 2007). Community gardens also appear to have a lack of vandalism in comparison to surrounding areas, as well as improving the attitudes of residents towards their neighborhoods by 51% (Armstrong, 2000). In a study by Tieg et al. (2009), numerous gardeners reported feeling safe and comfortable inside the garden, even when set in locations known for drug sales, vandalism, and theft.

The idea that being in nature has a healing power has been around since ancient times (Davis, 2011). Gardens have been described as 'spiritual and healing places that help gardeners to process emotions, provide a sense of purpose, and foster stability through the regular cycles of the garden' (Hale et al., 2011, p. 1860). Many gardeners describe gardening as therapeutic, saying the experience allows them to express emotions and work through pain in a healthy manner (Hale et al., 2011). A gardener interviewed by Hale et al. (2011) said that when stressed or worried, "I just come down [to the garden] and start working in the soil, working with the plants and it's like the soil just absorbs all that anger" (p. 1860). In a program evaluation of a group of California domestic violence shelters that used community gardening as both a source of food and an activity for residents, gardening activities were described as helping to sooth the adjustment to the shelter (Okvat & Zautra, 2011). Gardening was described by residents and staff workers as a stress reliever and motivation, along with giving hope through seeing new growth (Okvat & Zautra, 2011) Okvat and Zautra (2011) assert that nature provides an 'important buffer to life stress' (p. 377). With all these testimonies towards the therapeutic nature of gardening, use of gardens for the promotional of mental health would be a beneficial topic to research and pursue.

In Milligan, Gatrall, and Bingley's study (2004), communal gardens were found to decrease social isolation, aiding in the development of social networks, which have the ability to act as a buffer to stressors (Okvat & Zautra, 2011). Many gardeners are drawn to gardens, and participated in community gardens, due to the social opportunities they offered (Teig et al., 2009). In the Teig et al. (2009) study, a garden near a community health center recruited adolescents seen at the center and paired them with a mentor in the garden; one gardener described gardening as cathartic for the adolescents because they could start trusting their mentors and talking to them. In the Wakefield et al. (2007) study, community gardeners commented on the enhancement of community connection. Gardeners shared ideas, tools, produce, stories, even cultures. The gardens served as meeting places and allowed for discussion of other, non-garden related issues in the community (Wakefield et al., 2007). The communal nature of gardens could add to the therapeutic quality of gardens to intensify possible effects on mood and mental health.

There are several theories on nature's relation to human health and affect (Soderback, Soderstrom & Schalander, 2004). Kaplan's evolutionary theory states that the natural environment's visual patterns are easiest to interpret due to a person's use of involuntary attention in comparison to directed attention, which humans use when flooded with information from urban, artificial environments (Soderback et al., 2004). Involuntary attention is described as preferable as it may release negative stress, whereas directed attention requires lots of energy and leads to overloading and negative stress, impatience, and irritability (Soderback et al., 2004). Similarly, the Attention Restoration Theory asserts that prolonged use of directed attention results in mental fatigue, which can lead to trouble concentrating and irritability (Okvat & Zautra, 2011). The Attention Restoration Theory goes on to say that natural environments can

relieve mental fatigue because they allow directed attention to rest (Okvat & Zautra, 2011). Ulrich et al.'s psycho-evolutionary theory states that humans react with positive emotional physiological responses when in nature due to a long adaptation of using nature for survival (Soderback et al., 2004). Each of these theories helps to explain the positive emotional effect of being in nature as cited in Soderback et al. (2004). Participants in a community gardening study by Wakefield et al. (2007) reported their interactions with nature as relaxing and calming. These theories on natural environments can be applied to time spent in gardens, surrounded by plants and different elements from nature.

Increased levels of physical activity brought on through being in nature and gardening can also have a positive effect on mood; higher levels of physical activity have been correlated with lower levels of mental illness and depressed mood among all ages (Birkeland, Torsheim, & Wold, 2009). Birkeland et al. (2009) discusses two hypotheses about the relation between physical activity and mood, the protection hypothesis and the inhibition hypothesis. The protection hypothesis proposes that physical activity protects against depressed mood while the inhibition hypothesis suggests that to some degree, depressed mood disables a person's capability of being physically active (Birkeland et al., 2009). If the inhibition hypothesis is correct, breaking the cycle of depressed mood reducing physical activity while lack of physical activity further decreases mood can be very difficult (Birkeland et al., 2009). A solution to this cycle could be gardening. According to both Brown (2004) and Tse (2010), gardening activities can provide regular physical activity that improves physiological stability and higher level functioning (Brown, 2004; Tse, 2010).

Although a community garden is usually a group venture not specifically targeted towards improvement of mood in participants, a commonly used complementary intervention for

patients with depressed mood is therapeutic horticulture (Gonzalez et al., 2010). Therapeutic horticulture is a nature-based intervention with a long clinical tradition that involves participation in enjoyable activities, social and behavioral activation, and moderate levels of physical activity (Gonzalez, et al., 2011). Therapeutic horticulture includes different gardening activities, has been used in many countries for many years, and is relatively easy to facilitate (Gonzalez et al., 2010, Gonzalez et al., 2011).

Benefits of therapeutic horticulture have been reported for anxiety and depressive symptoms in varied mental health populations (Gonzalez et al, 2010) along with the ability to continue using techniques learned in therapy at home and the adaptability of programs (Soderback etal., 2004). In those with clinical depression, therapeutic horticulture has shown to decrease depressive symptoms along with improving perceived focus ability (Gonzalez et al., 2010). Gonzalez et al. (2010) found that the mixture of positive distraction along with psychological distance from everyday demands through therapeutic horticulture appears to lead to a decline in severity of depression. This reduction of depression severity lasted up to three months after therapeutic horticulture intervention ended (Gonzalez et al., 2010). Group interventions with therapeutic horticulture led to group cohesiveness along with an increased positive affect (Gonzalez et al., 2011). Gonzalez et al, (2010) suggest that clinicians dealing with clinical depression inform clients about the potential benefits of horticulture. So far, most of the existing knowledge about therapeutic horticulture is based in passive use of gardens, where patients are encouraged to spend time in gardens relaxing or doing other non-gardening activities (Davis, 2011). More active and physical uses of gardens has also been studied, but as mentioned in Davis (2011), the field of therapeutic horticulture has a lot of room for study and much more can be learned.

In elderly individuals, gardening has been identified as an activity that enhances mental and physical well being as well as enhancing socialization (Brown et al., 2004, Tse, 2010). For community-dwelling older adults, gardening leads to positive effects, such as improvements in psychological well-being (Tse, 2010), and learning new gardening skills can stimulate curiosity among the elderly (Tse, 2010, Wakefield et al., 2007). Over short time periods, horticulture programs may have beneficial effects on the psychological well-being of older adults (Barnicle & Midden, 2003). Gardening has been shown to have a relationship with reduced blood pressure, shorter hospital stays, relaxed emotional states, and improved quality of life, along with maintaining a healthy lifestyle and having independence in activities of daily living (Brown, 2004). Gardening activities also give gardeners a sense of responsibility and accomplishment from growing and watching the process of plants growing (Tse, 2010). Although these studies focused on the elderly, rather than college students, the ideas that gardening enhances overall well being and inspires curiosity through learning new skills are worth looking into among a younger population.

Several studies have tested the association between group gardening programs and mood. Barnicle and Midden's study (2003) was a seven week gardening program set up with hour long gardening programs each week for the study group and no access to gardens for the control group. This study used the Affect Balance Scale to test psychological well being and found significant increases in psychological well being among the gardening group (Barnicle & Midden, 2003). A study by Martin et al. (2007) consisted of hour-long gardening sessions once a week for ten weeks, observations and interviews throughout the study showed that individuals found solace and support from the group gardening sessions. An eight week study by Tse (2010) involved nursing home residents planting and taking care of plants with weekly visits from

research assistants. Significant improvements were found in all psychological parameters, as well as in socialization, life satisfaction, and loneliness (Tse, 2010).

Another study by Gonzalez et al. (2011) focused more on group cohesiveness in a therapeutic horticulture setting. The study used a 12-week therapeutic horticulture program with three to seven participants in each group (Gonzalez et al., 2011). Tools for measuring change in affect and group cohesion included the Beck Depression Inventory, the Positive Affect Scale from the Positive and Negative Affect Scale, and the Therapeutic Factors Inventory-Cohesiveness Scale (Gonzalez et al. 2011). It was observed and measured that the groups quickly gained strong cohesiveness (Gonzalez et al. 2011). Along with strong cohesion, a decline was found in depression severity, anxiety, and stress, while positive affect increased (Gonzalez et al. 2011).

Gardening and horticulture therapy have been studied with other diseases along with mood. It has been found that a hospital's physical environment greatly affects a patients' medical outcome (Soderback et al., 2004). Whichrowski, Whiteson, Haas, Mola, and Rey (2005) performed a study examining the effects of horticultural therapy on mood and heart rate with inpatients in a cardiopulmonary rehabilitation program. Between forty and fifty percent of myocardial infarction patients report at least moderate levels of anxiety while in the hospital and depression in cardiac patients can range from fifteen percent to thirty percent while still in the first stages of rehabilitation (Whichrowski et al., 2005). With these high rates of mood disorders, improved mood in cardiac patients is important for overall wellness in cardiac patients (Whichrowski et al., 2005). The study population scored higher on a mood test after viewing and spending time in a natural environment (Whichrowski et al., 2005). Patients in horticultural activities also scored higher than those in non-horticultural activities (Whichrowski et al., 2005).

Whichrowski et al. (2005) concludes by noting that in addition to objective measures of mood, staff for the rehabilitation program noticed a positive shift in mood of patients in the horticultural therapy program along with more lively and engaging interactions.

Davis (2011) analyzed a rooftop garden at a hospital in Knoxville, TN and its use by hospital workers, patients, and visitors along with its use in rehabilitation. The garden contained a range of active and passive elements, providing space for both therapy activities and relaxation within the garden (Davis 2011). The garden was used mainly with rehabilitation patients who sometimes spent months in the hospital and reported the need for usable outdoor space to be very important (Davis, 2011). In interviews, both staff and patients described the garden as extremely valuable (Davis, 2011). Being outside was also more meaningful to patients and often facilitated breakthroughs in self-confidence, outlook, and reflection on therapy (Davis, 2011). Patients described the garden's most beneficial aspect as psychological (Davis, 2011). Some of these benefits included getting away from the hospital and relaxing or talking to friends in a less sterile environment along with helping them maintain a sense of self, a more positive outlook, and a sense of well-being (Davis, 2011).

The multiple studies cited above show that working in a garden has been linked to improved mood. There are few studies with a main focus on gardening and mood however, and no studies were found that focused on college populations. With the common occurrence of depressed mood in adolescents and young adults, discerning how work in a garden affects mood could improve the lives of college students. This study will assess how participation in a community gardening program affects the mood of college students over six weeks, so more may be learned about the potential of gardens on college campuses.

Chapter 3: Methods

Participants were recruited through responses to informational flyers about the study posted on the campus of James Madison University. Respondents included both individuals interested in gardening, and individuals who needed volunteer hours for either an on campus organization or a service learning class. Respondents to the flyers were asked for their gender, age, year in school, major, gardening experience, and times available to garden. The demographic data were used to sort respondents into either a therapy group or a control group, matching the groups as closely as possible; however much of the consideration was given to availability of participants for the gardening time slots chosen over the six week study. Only respondents ages eighteen to twenty-two were included in the study. Therapy groups were divided into groups of four participants, although due to low attendance, the final group sizes ended up being two or three. Gardening participants that only showed up for the pretest were dropped from the study, as were controls that did not take the posttest. Participants dropped from the study were not included in any data analysis. Participants were allowed to withdraw at any time with no consequences of any kind, although after the first week, no participants dropped out. The study was approved by the James Madison Institutional Review Board, a copy of the consent form used can be viewed in Appendix A.

In the final roster, there were eight gardening subjects and eight controls. Within the gardening group, there were five juniors (those in their third year at James Madison University) and three seniors (fourth years at JMU). There were six female gardening participants and two males. There was a variety of majors represented, as seen below in Table 1; majors covered a broad range of topics from sciences such as biology, to humanitarian concentrations such as hospitality and tourism management. The control group included seven juniors, along with one

participant that chose not provide a year or major. There were seven females and one male within the control group. Like the gardening group, a range of majors was represented from both the sciences and humanities.

Table 1: De-identified Participants

Group	Major	Year	Gender
Gardening 1	Geographic Sciences	Junior	Female
Gardening 1	Public Policy & Administration	Junior	Female
Gardening 1	Accounting	Junior	Male
Gardening 2	Biology	Junior	Female
Gardening 2	Global Justice & Policy	Junior	Female
Gardening 2	Biotechnology	Senior	Female
Gardening 3	Accounting	Senior	Female
Gardening 3	Hospitality & Tourism Management	Senior	Male
Control	Justice Studies	Junior	Female
Control	History	Junior	Female
Control	Political Sciences	Junior	Female
Control	SMAD (Digital Video & Cinema)	Junior	Female
Control	Biology/Health Sciences	Junior	Female
Control	IDLS (European History & Culture)	Junior	Female
Control			Male
Control	Dietetics	Junior	Female

In order to measure changes in mood and affect, two scales were used. The pretest and posttest utilized the Positive and Negative Affect Scale – Expanded Addition (PANAS-X). The PANAS-X includes sixty words or phrases that describe feelings or emotions (Watson & Clark, 1994). Due to an error by the experimenter, only forty-five items were included in the pretest and posttest given to participants. The form used for this study can be viewed in Appendix B. Participants were asked to read each word or phrase and rank to what extent they had felt that way in the past few weeks (Watson & Clark, 1994). The scale can also be used with time periods as narrow to ‘at the moment’ or ‘today’ to as broad as ‘this year’ or ‘in general’ (Watson

& Clark, 1998). In this study, the time frame of 'in the past two weeks" was used. Participants ranked each word or phrase with a score of one (very slightly or not at all) through five (extremely). These rankings were then used in an item composition of the PANAS-X scales in order to gain meaningful scales from the rankings (Watson & Clark, 1994). These scales were affected by the shortening of the PANAS-X from sixty to forty-five items. The PANAS-X includes thirteen affect scales, starting with general scales of positive and negative affect and moving towards more specifics scales such as fear, joviality, and fatigue (Watson & Clark, 1994). For each scale, several of the items from the PANAS-X were listed, and the rankings given by each participant were added up to achieve a final number score for each scale (Watson & Clark, 1994). Table 2 provides a breakdown of what items each scale included. The number behind each affect listed symbolizes the number of items making up each scale.

Table 2: Affect Scales for PANAS-X

General Dimension Scales	
Negative Affect (9)	afraid, scared, nervous, jittery, hostile, guilty, ashamed, upset, distressed
Positive Affect (7)	active, alert, determined, enthusiastic, excited, interested, proud
Basic Negative Emotion Scales	
Fear (6)	afraid, scared, frightened, nervous, jittery, shaky
Hostility (3)	angry, hostile, loathing
Guilt (5)	guilty, ashamed, blameworthy, angry at self, dissatisfied with self
Sadness (5)	sad, blue, downhearted, alone, lonely
Basic Positive Emotion Scales	
Joviality (6)	happy, joyful, excited, enthusiastic, lively, energetic
Self-Assurance (3)	proud, confident, bold
Attentiveness (3)	alert, concentrating, determined
Other Affective States	
Shyness (3)	shy, sheepish, timid
Fatigue (3)	sleepy, tired, drowsy
Serenity 2)	calm, at ease
Surprise (2)	amazed, astonished

Weekly changes in affect among the gardeners were measured using the Affect Balance Scale. The Affect Balance Scale was developed by Bradburn in 1969 and can be used to measure participants' current well being (Barnicle & Midden, 2003). The Affect Balance Scale is composed of ten yes or no questions and contains two subscales, five questions make up a positive subscale and five questions make up a negative subscale (Barnicle & Midden, 2003). These two subscales can be used to make a generalization about overall affect (Barnicle & Midden, 2003). The form used in this experiment can be viewed in Appendix C. In assessing Affect Balance Scale responses for this experiment, both the subscales and responses to individual questions were analyzed. For the subscales, the numbers of 'yes' responses were tallied each week to find the totals for both positive and negative affect. These totals ranged from zero to five for each scale.

All participants took the Positive and Negative Affect Scale – Expanded Addition (PANAS-X) at the start of the study and again at the conclusion of the six-week study. Participants in the therapeutic groups met for one hour a week for six weeks. The first fifty minutes were spent gardening. Activities each week included soil preparation, planting, weeding, pruning, and watering. A more detailed breakdown of weekly activities and locations can be seen in Table 3. A breakdown of study deadlines for participants can be seen in Table 4. The gardening activities took place in the ISAT balcony garden and the campus arboretum at James Madison University. Gardening sessions took place on Mondays at noon and 2pm and Wednesdays at 11:15am. The last ten minutes of the gardening sessions were spent filling out the Affect Balance Scale (ABS).

Table 3: Study Activities by Date:

Day	Location	Activities
March 12	ISAT garden	Orientation to study, weeding, relocating plants
March 14	ISAT garden	Orientation to study, weeding, relocating plants
March 19	ISAT garden	Weeding, relocating plants, planting seedlings, watering
March 21	ISAT garden	Weeding, relocating plants, planting seeds, watering
March 26	ISAT garden	Weeding, relocating plants, planting seeds, watering
March 28	Arboretum	Weeding the labyrinth
April 2	Arboretum	Weeding the labyrinth
April 4	Arboretum	Weeding the labyrinth
April 9	Arboretum	Preparing area for tree planting
April 11	Arboretum	Preparing area for tree planting
April 16	Arboretum	Weeding the labyrinth
April 18	Arboretum	Weeding the labyrinth

Table 4: Study Schedule and Deadlines

Date	Mar 13-19	Mar 20-26	Mar 27 -Apr 2	Apr 3-9	Apr 10-16	Apr 17-23	Apr 24 -May
Orientation & Pre-test							
Post-test							
Gardening Sessions							
Data Analysis							

Confidentiality was maintained by using a study identification number that was used for identification on each survey. Participants were informed of the anonymous nature of the study and were asked to keep participation of other members confidential. All identifiable information and data were kept in a locked file in the office of the research advisor. This study was approved by the James Madison Institutional Review Board.

Data analysis included calculations of any mood changes in both the therapy group and control group from the start to the end of the six weeks on the PANAS-X. The Affect Balance Scale results were analyzed to see if there were any trends in mood from week to week in participants in the gardening group only. T-tests were conducted to determine any significant changes.

Chapter 4: Results

For the test groups participating in gardening, all pretests were taken on March 12, 2012 and March 14, 2012. Control subjects took the pretest between March 12, 2012 and March 20, 2012. All post-tests were taken on April 16, 2012 and April 18, 2012. The pretest dates coincided with the week after the university's spring break and the posttest dates occurred two weeks prior to finals week.

T-tests were used for statistical analysis of the Positive and Negative Affect Scale-X. Raw data was not reported because the values from the ranking system are meaningful only when compared as a pre and posttest for the purposes of this experiment. Upon statistical analysis, t-tests showed no significant changes in mood or affect among control subjects from pretest to posttest. Among the gardening participants, there were some changes in different affects and emotions from pretest to posttest. Negative affect went down overall at a statistically significant level ($t(7) = 3.016$, $p<.05$) despite positive affect having no significant change. Joviality did increase, although not with a significant level. Feelings of fatigue went up significantly ($t(7)= 2.614$, $p<.05$). Although not statistically significant, self assurance levels showed a slight increase.

In analyzing the data from the Affect Balance Scale (ABS), t-tests showed no significant change from pre to posttest. The sample size of eight was too small to run repeated measures, so more detailed statistical results were unattainable. However, clear patterns could be seen when comparing answers to individual questions over the six weeks. Among the gardeners, attendance was relatively good. None of the subjects missed more than two sessions, and all were very apologetic when they did miss a gardening session.

Overall, the weekly Affect Balance Scale showed varying levels of positive affect, with scores having little or no pattern. The tallied scores adding up the total number of 'yes' answers to the five positive affect questions can be seen in Table 5 below. Blank cells refer to absences. For three of the participants, subjects C, D, and F, positive affect increased from the first three weeks of the study to the final three weeks, other tallies had no distinguishable pattern.

Table 5: Number of Positive Responses Each Week

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	3	2	4	4		
B	0	3		5	1	1
C	2	1	3		4	4
D	3	2	3	3	5	5
E	3	0	3	3	3	1
F	0		0	2	0	2
G	3	2	0	2		
H	4	5		5		5

Negative affect scores were low overall, as shown in Table 6. Out of the five yes or no questions measuring negative affect, more than half the tallies of 'yes' responses throughout the entire study were 0, with only three scores of 2, four scores of 3, one score of 4, and only one response of the maximum, 5, over the six week study. All of the non-zero totals came from three subjects, B, C, and D. On the sixth, and last, week of gardening, the majority of gardeners had a negative affect score of zero for the ABS, except for subject B, who scored a two. Despite low scores for negative affect the final week, positive affect was random with scores ranging from one to the maximum of five as seen in Table 5. One gardener, participant F, listed 'no' to almost every single question, both positive and negative, throughout the six-week study. This gardener had zeros for every week's negative affect score and had a score of two for two of the positive affect tallies.

Table 6: Number of Negative Responses Each Week

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	0	0	0	0		
B	4	3		1	3	2
C	2	3	1		2	0
D	1	3	5	2	1	0
E	0	0	0	0	0	0
F	0		0	0	0	0
G	0	0	0	0		
H	0	0		0		0

Individual questions of the ABS from which these positive and negative affect scores were derived had further patterns that could be analyzed. There were five positive yes or no questions and five negative yes or no questions dispersed in the scale.

Answers to the first positive question "at the current time, do you feel particularly excited or interested in something" seemed unrelated to the gardening experience. This question was also the only question that referred to the future instead of asking about the past hour of gardening. Individual responses can be viewed in Table 7- no discernible pattern could be found among responses.

Table 7: At the current time, do you feel particularly excited or interested in something?

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	yes	no	yes	yes		
B	no	no		yes	yes	no
C	no	no	yes		yes	yes
D	yes	yes	yes	yes	yes	yes
E	yes	no	yes	yes	yes	no
F	no		no	no	no	no
G	yes	yes	no	no		
H	yes	yes		yes		yes

The second positive question, "at the current time, do you feel proud because someone complimented you on something you had done" had mixed responses as seen in Table 8. There was a notable shift in responses from more 'no' responses in the first two weeks of the study to more 'yes' responses in the last few weeks.

Table 8: At the current time, do you feel proud because someone complimented you on something you had done?

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	no	yes	yes	yes		
B	no	yes		yes	no	yes
C	yes	no	yes		yes	yes
D	yes	no	yes	yes	yes	yes
E	no	no	no	no	no	no
F	no		no	no	no	no
G	no	no	no	no		
H	yes	yes		yes		yes

The third positive question "at the current time, do you feel pleased about having accomplished something," was almost always answered with a 'yes' as shown in Table 9. There was an interesting pattern of when the 'no' answers occurred: most weeks had one or two 'no' responses, but on week three, there were four 'no' responses. This made up two-thirds of the attendants that week.

Table 9: At the current time, do you feel pleased about having accomplished something?

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	yes	yes	yes	yes		
B	no	yes		yes	no	no
C	yes	yes	no		yes	yes
D	yes	yes	no	no	yes	yes
E	yes	no	yes	yes	yes	yes
F	no		no	yes	no	yes
G	yes	no	no	yes		
H	yes	yes		yes		yes

The fourth positive question, “at the current time, do you feel on top of the world,” was answered mostly with ‘no’s.’ Referring to Table 10, it can be seen that only one person, participant H, answered with a ‘yes’ every week, other ‘yes’ responses appear random.

Table 10: At the current time, do you feel on top of the world?

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	no	no	no	no		
B	no	no		yes	no	no
C	no	no	no		no	no
D	no	no	no	no	yes	no
E	no	no	no	no	no	no
F	no		no	no	no	no
G	no	no	no	no		
H	yes	yes		yes		yes

The last positive question, “at the current time, do you feel that things are going your way,” was the only question for which no participant gave the same answer every week. Individual responses can be viewed in Table 11. Along with no uniform response among any one subject for this question, no individual participant had a very strong pattern of answers across the six weeks. Despite this, there was an overall pattern for the group. The first two weeks had more answers of ‘no,’ while the third through sixth weeks had more subjects answer ‘yes,’ with every participant answering ‘yes’ on week four.

Table 11: At the current time, do you feel that things are going your way?

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	yes	no	yes	yes		
B	no	yes		yes	no	no
C	no	no	yes		yes	yes
D	no	no	yes	yes	yes	yes
E	yes	no	yes	yes	yes	no
F	no		no	yes	no	yes
G	yes	yes	no	yes		
H	no	yes		yes		yes

The negative affect questions had a lot fewer 'yes' answers than the positive affect questions did. Answers to the negative affect questions did have much stronger patterns. Five of the eight subjects answered 'no' to every question every week of the study. The three that did respond with 'yes' answers tended to follow a pattern of more 'yes's' at the beginning of the study than at the latter part of the study.

The first negative affect question, "at the current time, do you ever feel so restless that you couldn't sit long in a chair," was questioned for wording by the subjects, so they were instructed to answer the question as it pertained to the past hour of gardening work. Responses can be viewed in Table 12. There was a decrease in 'yes' responses during the last week of the study.

Table 12: At the current time, do you ever feel so restless that you couldn't sit long in a chair?

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	no	no	no	no		
B	yes	yes		yes	yes	yes
C	yes	yes	no		yes	no
D	no	yes	yes	yes	yes	no
E	no	no	no	no	no	no
F	no		no	no	no	no
G	no	no	no	no		
H	no	no		no		no

For the second negative question, "at the current time, do you ever feel lonely or remote from other people," yes answers only occurred in the first three weeks of the study. Individual responses can be seen in Table 13.

Table 13: At the current time, do you ever feel lonely or remote from other people?

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	no	no	no	no		
B	yes	yes		no	no	no
C	no	yes	no		no	no
D	no	yes	yes	no	no	no
E	no	no	no	no	no	no
F	no		no	no	no	no
G	no	no	no	no		
H	no	no		no		no

The third negative affect question asked, "at the current time, do you feel bored," responses can be seen in Table 14. More 'yes' responses came during the first half of the study, with the maximum number of 'yes' responses occurring during the first week of the study.

Table 14: At the current time, do you feel bored?

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	no	no	no	no		
B	yes	no		no	no	no
C	yes	yes	yes		yes	no
D	yes	no	yes	no	no	no
E	no	no	no	no	no	no
F	no		no	no	no	no
G	no	no	no	no		
H	no	no		no		no

The fourth negative affect question, "at the current time, do you feel depressed or very unhappy," was answered with a no by every respondent every week except for one 'yes' answer on week five from participant B, as seen in Table 15.

Table 15: At the current time, do you feel very depressed or unhappy?

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	no	no	no	no		
B	no	no		no	yes	no
C	no	no	no		no	no
D	no	no	no	no	no	no
E	no	no	no	no	no	no
F	no		no	no	no	no
G	no	no	no	no		
H	no	no		no		no

The final negative affect question was "at the current time, do you feel upset because someone criticized you." Responses can be seen in Table 16. Among the two participants who answered 'yes' to this question, there was no clear pattern of when 'yes' and 'no' responses occurred.

Table 16: At the current time, do you feel upset because someone criticized you?

Participant	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
A	no	no	no	no		
B	yes	yes		no	yes	yes
C	no	no	no		no	no
D	no	yes	no	yes	no	no
E	no	no	no	no	no	no
F	no		no	no	no	no
G	no	no	no	no		
H	no	no		no		no

Although there was little statistical analysis of the weekly moods of gardeners, multiple times participants would state how relaxed they were after gardening, or would come into the gardening session stressed out, but leave in a much calmer state. Participants also became more talkative as the weeks passed. At the beginning of the study, participants barely talked to one another and did their gardening tasks quietly. By the last couple of weeks, steady conversation

took place at each gardening session. One of the weeks, a female participant came to the gardening session extremely stressed out about schoolwork and some personal problems she was dealing with. After an hour of gardening and talking about what she was dealing with, she took the weekly test and looked up halfway through to say "I don't feel anything," which was much different than the stress levels she had come into the garden with. Other participants mentioned that they enjoyed being able to garden each week, although most commented that they had hoped to learn some more about gardening rather than just spending time.

Chapter 5: Discussion

The changes measured by the pretest/posttest, along with the patterns seen in responses to the weekly tests for gardening subjects show support for the original hypothesis. Observations of participants also supported the hypothesis's prediction of positive changes in mood after participation in a community gardening program. However, these changes in mood were not as extreme as originally expected, this may be due to low subject numbers or the constant changes in location.

Overall, negative affect went down among the gardening subjects. This was expected, as numerous studies found that gardening had a positive impact on the mental health of gardeners. It was expected that there would be more of an increase in positive affect than was seen. Hale et al. (2011) found that gardening settings are associated with positive psychological processes. Studies have also related gardens to improved mental health overall (Armstrong, 2000; Teig et al., 2009; Wakefield et al., 2007).

Because the testing period ran from early March through late April, it was unclear if seasonal mood patterns played a part in the overall mood of participants. According to Rohan and Sigmon (2000), more than half of their sample of college students demonstrated a significant winter mood pattern. However, the changes in mood seen among subjects only had significant values among gardeners and not controls. This disparity in mood change despite changing seasons suggests that gardening did have an effect on subjects' moods. Despite the changes in mood being positive overall among gardening subjects, feelings of fatigue went up from pretest to posttest. This was strange, because usually if seasonal mood changes were taking affect, energy levels would increase later in spring and levels of fatigue would decrease (Rohan &

Sigmon, 2000), which leads to the conclusion that seasonal changed did not affect the participants significantly. Rohan and Sigmon also correlate higher levels of stress and depression towards finals week and the end of a semester among college students. The levels of fatigue among gardeners could have come from the proximity of the posttest to the upcoming finals week and increased stress that comes with work at the end of the semester, but no changes in fatigue level were seen among controls, which suggests a relation between fatigue and gardening. The fatigue levels could have been influenced by the calming effect of nature or from working outside. Studies by both Wakefield et al. (2007) and Okvat and Zautra (2011) found that nature provides a buffer to life stress along with a calming and relaxing atmosphere. It is possible that when allowed a serene hour in a garden, participants reported fatigue due to the sense of calm restfulness often felt in gardens.

Most of the participants explained that along with getting required volunteer hours, they were excited to learn more about gardening, especially the process of planting and tending to the garden. They described looking forward to watching the plants grow and being part of something fruitful and rewarding. These expectations were similar to the responses of gardeners in several studies. In a study by Hale et al. (2011), gardeners said that the process of following the garden from beginning to end, through soil preparation, planting, and watching growth, gave them a sense of responsibility and accomplishment. Other studies also discussed the purpose and coherence that the gardening process creates (Tse, 2010; Wakefield et al., 2007). While gardening subjects in this study voiced hope for similar outcomes, most weeks involved heavy weeding. One week had planting activities, but because of the constant change of locations, participants were unable to see these plants grow from week to week. Though this study was

only six weeks long, working in one location may have helped subjects become more attached to the garden and could have led to greater or different changes in mood.

Another factor to be considered in analyzing the effect of gardening on mood is the coping mechanisms and stress reactivity levels of individual participants. Felsten (2004) found stress reactivity to be a stronger predictor of depressed mood among college students than total levels of stress. Similarly, Steinhausen et al. (2006) found that poor adaptations skills are more closely linked to depressive symptoms than episodic depressive symptoms. In analyzing the weekly responses of gardeners to the Affect Balance Scale and conversations with gardeners, this seemed to be true. The gardeners all discussed similar stressors, but handled their stressors in different ways. As seen in the results section, one gardener came into the garden extremely stressed out one day, but after gardening and talking for an hour, she said her stress and emotions were gone and proceeded to answer the Affect Balance Scale with all 'no's.' Felsten (2004) found that during times of high stress, depressed mood increased, while stress reactivity does not. Among the Affect Balance Scale responses, Felsten's findings appear to hold true. While negative affect scores were low overall and five of the eight subjects answered 'no' to every negative affect question, the answers of the other three do suggest differences in stress reactivity. Two of the participants to answer 'yes' to some of the negative affect questions still had a good balance of positive affect to negative affect each week, but the third participant had a very high level of negative affect with low levels of positive affect throughout the week. Although these extremes of affect lessened throughout the study, the stress reactivity of this subject could have played a part in the responses given. Using gardening as an adaptation tool and studying the differences in mood among collegiate with different types of coping skills could help reveal more about gardening's affect on mood and how gardening programs can be tailored to different

groups of people based on their mood and coping skills. Gardeners in the Hale et al. (2011) study described their gardening experiences as therapeutic, helping them to work through their emotions and pain in a healthy way.

As the study progressed, gardening participants also grew more comfortable with each other. In the first few weeks, conversation was limited and by the last week, participants would converse throughout the entire hour and sometimes leave in groups. This followed the pattern seen in many of the community gardening studies, where social bonding played a part in the gardening experience (Okvat & Zautra, 2011; Teig et al., 2009; Wakefield et al., 2007). Milligan et al. (2004) found that community gardens decreased social isolation, which in turn helped act as a buffer to stressors. Every single gardening session also involved social interactions that strengthened from week to week, which affected the Affect Balance Scores. The second negative affect question, "At the current time, do you ever feel lonely or remote from other people?" only received 'yes' answers in the first three weeks of the study. This pattern in responses along with observations of social interactions show that the gardening sessions helped social networks. Teig et al. (2009) described gardening as cathartic for adolescents because of the trust built with other gardeners and the opportunities to talk to the other gardeners. It could be worthwhile to study the effect of gardening in groups as opposed to alone to see if the social interaction allowed through gardening programs is one of the leading contributors to change in mood while gardening.

Limitations:

Results may have been improved if gardeners had been able to plant more and learn more about gardening, as had been the original plan with the study. Unfortunately, this plan was revised due to miscommunication with faculty over the gardening location. The original plan

involved planting a garden near the James Madison occupational therapy clinic; unfortunately the area was graveled over. The ISAT rooftop patio garden was used as the initial meeting space, but was not large enough to accommodate the groups. After that, locations moved around the arboretum and involved a lot of weeding. Had the groups been able to stay in one location throughout the experiment, there might have been more of a connection to the garden, along with greater changes in mood.

Because all participants were volunteers, found through fliers posted around campus, the validity of the experiment was limited. From the volunteers, matching pairs was attempted, but time availability and actual attendance of those who responded to the fliers played a large part in actual results. With a final number of only eight participants in the garden, the study could be looked at as a case study, with a small cohort of controls for comparison. As mentioned earlier in the discussion, results were also affected by changing of location. Along with the points raised earlier, the changing location led to some confusion among the participants and contributed to the lowering of attendance. Despite the confusion, attendance did remain high, with no participant missing more than two of the gardening sessions. Weather could have also had a limiting affect on the experiment. For the most part, weather remained good throughout the experiment, but there was one day with snow, and one day that was very rainy. On the rainy day and the snowy day, attendance was lower, but the weather did not seem to greatly affect the responses to the weekly Affect Balance Scale.

As mentioned by Okvat and Zautra (2011), the 'effective dosage' of community gardening and the level of activity needed to see benefits from a gardening program are unknown. This study saw a change in pretest and posttest scores in a period of only six weeks. Patterns in responses to the Affect Balance Scale could be seen after four weeks. Barnicle and

Midden (2003) found that even short interactions with gardening could reduce blood pressure and lead to relaxed emotional states. Most of the studies reviewed had similar setups to this experiment, with weekly hour long gardening sessions over several weeks (Gonzalez et al., 2011; Tse, 2010; Martin, Miranda, & Bean, 2007; Barnicle & Midden, 2003). Barnicle and Midden (2003) saw significant increases in psychological well being after a seven week program. Martin, Miranda, and Bean (2007) ran their experiment for ten weeks, while Tse (2010), had an eight week gardening program, and Gonzalez et al. (2011) had a twelve week gardening program. All of these experiments saw significant changes in mood despite their relatively short duration (Gonzalez et al., 2011; Tse, 2010; Martin, Miranda, & Bean, 2007; Barnicle & Midden, 2003). This study was shorter than past studies, but still found benefits to overall mood and affect, which leads to a conclusion that even gardening programs with a short duration are beneficial to the mood of participants. Gonzalez et al. (2011) found that the reduction of depression severity lasted up to three months after therapeutic horticulture interventions had ended. It would have been interesting to follow up with participants of this study, although with such a small sample and the outside effects of summer break starting soon after the study ended, results would not have been reliable.

Conclusion:

With the results seen from this study, there is value in continuing gardening research. College students have a high prevalence of depressive symptoms (Rushton et al., 2002), and allowing them to work in a garden in the midst of classes and dorm life could be extremely beneficial in improving mood. From my own experience, I know that it takes effort to make time for being outdoors when classes, studying, and living in a dorm require so much time. Giving college students more natural environments, such as the arboretum at James Madison

University, could improve their mood. Allowing opportunities to garden could increase mood even further, especially if linked with mental health programs such as James Madison University's Varner House.

Appendix A

Consent to Participate in Research

Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by Alicia Mau from James Madison University. The purpose of this study is to determine the effect of participation in a community gardening program on mood of college students. This study will contribute to the researcher's completion of her senior honors thesis.

Research Procedures

Should you decide to participate in this research study, you will be asked to sign this consent form once all your questions have been answered to your satisfaction. Two groups will be formed, an experimental and a control group. This study consists of a gardening activity for the experimental group and a set of surveys for both groups that will be administered to individual student participants on the JMU campus at the occupational therapy clinic. You will be asked to provide answers to a series of questions related to mood and affect.

Time Required

Participation in this study will require six hours of your time. There will be weekly, hour long sessions over a course of six weeks

Risks

The investigator does not perceive more than minimal risks from your involvement in this study (that is, no risks beyond the risks associated with everyday life).

Benefits

Potential benefits from participation in this study include the opportunity to work in a community garden.

Confidentiality

The results of this research will be presented as a final report in the JMU collection and possible publication in a journal. The results of this project will be coded in such a way that the respondent's identity will not be attached to the final form of this study. The researcher retains the right to use and publish non-identifiable data. While individual responses are confidential, aggregate data will be presented representing averages or generalizations about the responses as a whole. All data will be stored in a secure location accessible only to the researcher. Upon completion of the study, all information that matches up individual respondents with their answers will be destroyed. This study is confidential; therefore, please keep all other subjects' names confidential.

Participation & Withdrawal

Your participation is entirely voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind.

Questions about the Study

If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

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Health Sciences

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Questions about Your Rights as a Research Subject

Dr. David Cockley

Chair, Institutional Review Board

James Madison University

(540) 568-2834

cocklede@jmu.edu

Giving of Consent

I have read this consent form and I understand what is being requested of me as a participant in this study. I freely consent to participate. I have been given satisfactory answers to my questions. The investigator provided me with a copy of this form. I certify that I am at least 18 years of age.

_____

Name of Participant (Printed)

_____ _____

Name of Participant (Signed) Date

_____ _____

Name of Researcher (Signed) Date

Appendix B

Study ID: _____

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way during the past two weeks.

Scale obtained from:

Watson, D. & Clark, L. A. (1994). Manual for the Positive and Negative Affect Scale – Expanded Form. Retrieved from the University of Iowa, Department of Psychology website: http://www.psychology.uiowa.edu/faculty/clark/panas-x.pdf

1 very slightly or not at all	2 a little	3 moderately	4 quite a bit	5 extremely

_____sad	_____active	_____angry at self
_____calm	_____guilty	_____enthusiastic
_____afraid	_____joyful	_____downhearted
_____tired	_____nervous	_____sheepish
_____amazed	_____lonely	_____distressed
_____shaky	_____sleepy	_____blameworthy
_____happy	_____excited	_____determined
_____timid	_____hostile	_____frightened
_____alone	_____proud	_____astonished
_____alert	_____jittery	_____interested
_____upset	_____lively	_____loathing
_____angry	_____ashamed	_____confident
_____bold	_____at ease	_____energetic
_____blue	_____scared	_____concentrating
_____shy	_____drowsy	_____dissatisfied with self

Appendix C

At the current time, do you feel…. Study ID: _____

___yes ___ no 1. Particularly excited or interested in something?

___yes ___no 2. Did you ever feel so restless that you couldn't sit long in a chair?

___yes ___ no 3. Proud because someone complimented you on something you had done?

___yes ___ no 4. Very lonely or remote from other people?

___yes ___ no 5. Pleased about having accomplished something?

___yes ___ no 6. Bored?

___yes ___ no 7. On top of the world?

___yes ___ no 8. Depressed or very unhappy?

___yes ___ no 9. That things are going your way?

___yes ___ no 10. Upset because someone criticized you?

Developed from:
Statistics Canada. *Mood (Bradburn Affect Scale).* Retrieved from:
http://www.statcan.gc.ca/concepts/health-sante/pdf/mood-humeur-eng.pdf

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